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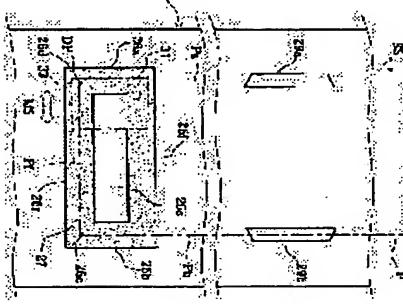
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(54) PRINTING ON PRINTING SHEET POSITIONED BY SENSOR

(57)Abstract:

PROBLEM TO BE SOLVED: To print image data on a printing sheet while positioning accurately.

SOLUTION: A printing sheet P is guided by mean of guides 29a and 29b and sub-scan fed such that the opposite side ends are located, respectively, above a left groove 26a and a right groove 26b. In this regard, a carriage 31 equipped with a photoreflector 33 is located at a position shown by a dashed line. The photoreflector 33 detects the printing sheet P, if any, at the connecting part 26d of the left groove 26a and a downstream side groove 26b. When the front end of the printing sheet P is detected by the photoreflector 33, sub-scan feeding is stopped and printing is started at the upper end part Pf (lower end on FIG. 1) of the printing sheet P by means of a part of nozzles located above the downstream side groove 26b.



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CLAIMS

[Claim(s)]

[Claim 1] It is the dot recording device which records a dot on the surface of print media using the dot recording head in which two or more dot formative elements which carry out the regurgitation of the ink droplet were prepared. The horizontal-scanning mechanical component which drives said dot recording head to said print media, and performs horizontal scanning. The head mechanical component in which drive at least the part of said two or more dot formative elements in the midst of said horizontal scanning, and a dot is made to form. The vertical-

scanning mechanical component which drives said print media in the direction of said horizontal scanning, and the direction at which it crosses, and performs vertical scanning. It is the dot recording device formed in the location at which said detection section does not cross the locus of the ink droplet breathed out from said dot formative element in the case of said horizontal scanning by having the detection section for detecting the existence of said print media in a predetermined detection point, and a control section for controlling said each part.

[Claim 2] It is a dot recording device according to claim 1. Said control section The function which starts said vertical scanning of said print media from the condition which does not have said print media in said detection point. When said detection section detects said print media, in the function to stop said vertical scanning of said print media about the direction of said vertical scanning location A dot recording device equipped with the function which starts said horizontal scanning, making an ink droplet breathe out from said dot formative element.

[Claim 3] It is the dot recording device which has the light sensing portion which is a dot recording device according to claim 1, and receives the light-emitting part with which said detection section injects light towards said predetermined detection point, and the reflected light in which said light reflected in said print media.

[Claim 4] It is the dot recording device formed so that it may be a dot recording device according to claim 1 and said detection section may be driven by said dot recording head and the in the case of said horizontal scanning.

[Claim 5] It is the dot recording device with which it is a dot recording device according to claim 4, and the location of said detection section is set as the location near the dot formative element located in the edge of the downstream of the direction of said vertical scanning among said dot formative elements used for printing about the direction of said vertical scanning.

[Claim 6] So that it may be a dot recording device according to claim 1 and said dot formative element may be further faced in a part, of course [at least] of said horizontal scanning It is extended and prepared towards said horizontal scanning, and has the platen which supports said print media. Said platen In the location which faces the dot formative element located in the edge of the downstream of the direction of said vertical scanning among said two or more dot formative elements at least It is the dot recording device which is a position within the limits in which it has the downstream slot extended and prepared towards said horizontal scanning, and said detection point is in opening of said downstream slot, and said dot formative element exists about the direction of said vertical scanning.

[Claim 7] It is a dot recording device according to claim 6. Said platen Furthermore, it is prepared in the range which includes the impact range of the ink droplet from said dot formative element at least about the direction of said vertical scanning. It has a side slot connected to said downstream slot. Said dot recording device The predetermined horizontal-scanning location about the direction of said horizontal scanning is equipped with the guide section for positioning said print media in the case of said vertical scanning. Furthermore, said predetermined horizontal-scanning location Said print media is located in the stroke of said horizontal scanning

[Claim 8] It is a dot recording device according to claim 7. Said side slot The 1st side slot, the 2nd side slot, and one pair of ** are prepared. Said 1st side slot and said 2nd side slot The dot recording device formed so that one side edge section of the direction of said horizontal scanning of said print media may be located on said 1st side slot and the side edge section of another side may be located on said 2nd side slot, when said print media is in said predetermined horizontal-scanning location.

[Claim 9] The dot recording head in which two or more dot formative elements which carry out the regurgitation of the ink droplet of said dot formative elements in the case of horizontal scanning is not crossed, and detecting the existence of said print media in a predetermined detection point. It is the dot record approach which used the preparation and the dot recording device which records a dot on the front face of said print media. (a) The process which starts vertical scanning which is a scan which drives said record medium in the direction of said horizontal scanning, and the direction at which it crosses from the condition that said print media cannot be found in said detection point. (b) when said detection section detects said print media, in the process which stops said vertical scanning of said print media about the direction of said vertical scanning in a predetermined vertical-scanning location, and the condition that the (c) aforementioned print media is in said predetermined vertical-scanning location The dot record approach characterized by having the process which starts said horizontal scanning, making an ink droplet breathe out from said dot formative element.

[Claim 10] The dot recording head in which two or more dot formative elements which carry out the regurgitation of the ink droplet were prepared. The detection section for being prepared in the location at which the locus of the ink droplet of said dot formative element in the case of horizontal scanning is not crossed, and detecting the existence of said print media in a predetermined detection point. To a computer equipped with the dot recording device which **** and records a dot on the front face of said print media It is the record medium which recorded the computer program for making a dot record and in which computer reading is possible. The function which starts vertical scanning which is a scan which drives said record medium in the direction of said horizontal scanning, and the direction at which it crosses from the condition that said print media cannot be found in said detection point. When said detection section detects said print media, in the function to stop said vertical scanning of said print media about the direction of said vertical scanning in a predetermined vertical-scanning location. The record medium which is recording the computer program for making said computer realize the function which starts said horizontal scanning, making an ink droplet breathe out from said dot formative element and in which computer reading is possible.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the technique which prints by positioning a print sheet correctly especially about the technique which records a dot on the surface of a record medium using a dot recording head.

[0002]

[Description of the Prior Art] In recent years, the printer which carries out the regurgitation of the ink from the nozzle of the print head has spread widely as an output unit of a computer. Drawing 15 is the side elevation showing the circumference of the print head of the conventional printer. A print sheet P is sent in the direction of an arrow head A, and is suspended by the position by the upstream paper feed rollers 25p and 25q arranged on the upstream of platen 26o, and the downstream paper feed rollers 25r and 25s arranged on the lower stream of a river of platen 26o. And a print sheet P is supported so that head 28o may be faced on platen 26o. Then, a print sheet is turned little by little in the direction of an arrow head A from the print head with delivery at the position on platen 26o, and many ink droplets Ip are breathed out. Those ink droplets Ip reach the print sheet P on platen 26o, and an image is recorded on a print sheet.

[0003]

[Problem(s) to be Solved by the Invention] In the above printers, as shown in drawing 15, when the print sheet has shifted from the assumption location shown with a broken line, an image is not formed in the location assumed on the print sheet. Moreover, the image which was due to be formed near the edge of a print sheet may overflow a print sheet. In such a case, as shown in drawing 15, from the print sheet edge which an ink droplet should carry out this arrival cartridge, the print sheet which shifts, reaches the target on a platen and passes through a platen top after that will become dirty.

[0004] This invention is made in order to solve the above-mentioned technical problem in the conventional technique, and it aims at offering the technique which prints by positioning a print sheet correctly.

[0005]

[The means for solving a technical problem, and its operation and effectiveness] In order to solve a part of above-mentioned technical problem [at least], the following configurations were adopted in this invention. The dot recording device of this invention is a dot recording device which records a dot on the surface of print media using the dot recording head in which two or more dot formative elements which carry out the regularization of the ink droplet were prepared.

And it has the head mechanical component in which drive at least the part of the dot formative elements of plurality [midst / of horizontal scanning / the horizontal-scanning mechanical component which drives a dot recording head to print media, and performs horizontal scanning, and], and a dot is made to form, the vertical-scanning mechanical component which drives print media in the direction of horizontal scanning, and the direction at which it crosses, and performs vertical scanning, the detection section for detecting the existence of the print media in a predetermined detection point, and a control section for controlling each part. And the detection section is prepared in the location at which the locus of the ink droplet breathed out from a dot

formative element in the case of horizontal scanning is not crossed. By detecting print media by such mode, then the detection section, print media can be positioned correctly, a dot can be recorded and an image can be formed on a record medium.

[0006] In addition, in the above-mentioned dot recording device, it is desirable to perform the following printings. That is, vertical scanning of print media is started from the condition which does not have print media in a detection point. And when the detection section detects print media, vertical scanning of print media is stopped about the direction of vertical scanning in a predetermined vertical-scanning location. Then, horizontal scanning is started, print media making an ink droplet breathe out from a dot formative element in the condition of being in a predetermined vertical-scanning location. According to such printing, print media can be positioned on the basis of whether the point of print media arrived at the predetermined detection point. Therefore, print media can be correctly positioned about the direction of vertical scanning.

[0007] Moreover, as for the detection section, it is desirable to have the light-emitting part which injects light towards a predetermined detection point, and the light-sensing portion which receives the reflected light which light reflected in print media. If it does in this way, print media can be detected without contacting print media, and it will not become obstructive in the case of record of the dot to print media.

[0008] In addition, as for the detection section, it is desirable to be prepared so that it may drive by the dot recording head and one in the case of horizontal scanning. A dot recording head and the detection section do not interfere in such a mode, then horizontal scanning.

[0009] Moreover, as for the location of the detection section, about the direction of vertical scanning, it is desirable to be set as the location near the dot formative element located in the edge of the downstream of the direction of vertical scanning among the dot formative elements used for printing, [near such a mode, then the dot formative element which prints the point of print media], the existence of print media can be detected and print media can be positioned. Therefore, print media can be correctly positioned to the dot formative element which prints the point of print media.

[0010] In addition, as for a dot recording device, it is desirable to have the platen which is extended and prepared towards horizontal scanning and supports print media so that a dot formative element may be faced in a part of course [at least] of horizontal scanning. And

considering as the following configurations is desirable. That is, the platen shall have the downstream slot extended and established in the location which faces the dot formative element located in the edge of the downstream of the direction of vertical scanning among two or more dot formative elements at least towards horizontal scanning. And let the detection point of the detection section be a position within the limits in which it is in opening of a downstream slot, and a dot formative element exists about the direction of vertical scanning. Such a mode, then the tip of a record medium can detect being located in opening of a downstream slot, and can start record of the dot near the tip of the record medium by the dot formative element.

[0011] Moreover, as for a platen, it is desirable for it to be prepared in the range which includes the impact range of the ink droplet from a dot formative element at least, to consider as the mode which has a side slot connected to the downstream slot, and to consider as the still more nearly following configurations about the direction of vertical scanning, further. That is, a dot recording head equips the predetermined horizontal-scanning location about the direction of horizontal scanning with the guide section for positioning print media further in the case of vertical scanning. And print media is located in the stroke of horizontal scanning of a dot recording head about the direction of horizontal scanning, and one side edge section of the direction of horizontal scanning of print media makes the predetermined horizontal-scanning location where the guide section positions print media the location located on opening of a side slot. And let the detection point of the detection section be the position of the connection part of a side slot and a downstream slot. It can detect that such a mode, then the tip of a record medium are located in opening of a downstream slot, and the side edge section is located on opening of a side slot, and record of the dot to a record medium can be started.

[0012] In addition, it is desirable that the 1st side slot, the 2nd side slot, and ** prepare one pair

of side slot. And when print media is in a predetermined horizontal-scanning location, as for the 1st side slot and the 2nd side slot, it is desirable to prepare so that one side edge section of the direction of horizontal scanning of print media may be located on the 1st side slot and the side edge section of another side may be located on the 2nd side slot. When it detects that such a mode, then the tip of a record medium are located in opening of a downstream slot, and one side edge section is located on opening of the 1st side slot, the side edge section of another side will be located on opening of the 2nd side slot, and *— arrangement [like] can be checked and record of the dot to a record medium can be started.

[0013] In addition, this invention can be realized in various modes as shown below.

(1) A dot recording device, a print control unit, an airline printer.

(2) The dot record approach, the printing control approach, the printing approach.

(3) The computer program for realizing above-mentioned equipment and an above-mentioned approach.

(4) The record medium which recorded the computer program for realizing above-mentioned equipment and an above-mentioned approach.

(5) The data signal embodied in the subcarrier including the computer program for realizing above-mentioned equipment and an above-mentioned approach.

[0014] [Embodiment of the Invention] Below, the gestalt of operation of this invention is explained in order of the following based on an example.

A. outline [of an operation gestalt]: — B. equipment whole configuration: — arrangement [of C. print sheet]: — D. upper limit processing: — printing [of E. right-and-left side edge section]: — F. lower limit processing: — G. modification: [0015] A. The outline of an operation gestalt: drawing 1 is the top view showing the structure of the platen circumference of the ink jet printer in the gestalt of operation of this invention simple. In drawing 1, a print sheet P is caudad turned from the upper part, and vertical-scanning delivery is carried out to the sense of an arrow head SS. In that case, a print sheet P is guided with Guides 29a and 29b, and vertical-scanning delivery is carried out so that the both-sides edges Pa and Pb may be located on left-hand side slot 26a of a platen 26 and right-hand side slot 26b. On the other hand, in case vertical-scanning delivery of the print sheet P is carried out towards a platen 26 top, the carriage 31 of the print head is allotted to the location shown with a broken line. This carriage 31 equips with the photograph reflector 33 the field which faces a platen 26. This photograph reflector 33 is formed on carriage 31 in the upstream (the reverse direction of an arrow head SS) location more slightly than the nozzle of the edge of the downstream of the direction of vertical scanning. This photograph reflector 33 detects whether a print sheet P exists in the predetermined point DP of 26d of connection parts of left-hand side slot 26a and downstream slot 26.

[0016] It will be stopped by vertical-scanning delivery of a print sheet P, if vertical-scanning delivery of the print sheet P is carried out in the direction of an arrow head SS and the front end detected by the photograph reflector 33. And printing of the upper limit section Pf (in drawing 1, it becomes a lower limit) of a print sheet P is started by some nozzles which are on downstream slot 26 among the nozzles on the print head. Since the nozzle on the print head is prepared even in the point of the direction of an arrow head SS rather than the upper limit section Pf of a print sheet P, it can form an image, without making a margin to the upper limit of a print sheet P. Moreover, since the nozzle used for printing is a nozzle on downstream slot 26, also when an ink droplet shifts from a print sheet P, an ink droplet reaches the target in downstream slot 26 and does not reach center-section 26c of a platen 26. Therefore, the inferior surface of tongue of a print sheet P is not soiled by the ink droplet which reached center-section 26c of a platen 26. Moreover, it prints similarly about the right-and-left both-sides edge of a print sheet P by the nozzle located on left-hand side slot 26a and right-hand side slot 26b in the case of horizontal scanning. Therefore, a right-and-left both-sides edge can be printed without a margin, without soiling center-section 26c of a platen 26.

[0017] B. The configuration of equipment: drawing 2 is the block diagram showing the configuration of the software of this airline printer. By computer 90, the application program 95 is operating under a predetermined operating system. The video driver 91 and the printer driver 96

are included in the operating system, and image data D for transmitting to a printer 22 will be outputted to it through these drivers from an application program 95. The application program 95 which performs the retouch of an image etc. reads an image from a scanner 12, and it shows the image to CRT21 through a video driver 91, performing predetermined processing to this. The data ORG supplied from a scanner 12 are the original color picture data ORG which are read in a color copy and consist of a color component of (Red R) Green (G) and three colors of blue (B).

[0018] If this application program 95 emits a printing instruction, the printer driver 96 of a computer 90 will change image data into reception from an application program 95, and will have changed this into the signal (signal multiple-value-ized here about each color of cyanogen, a Magenta, Hierro, light cyanogen, a light Magenta, and black), which can process a printer 22. The interior of a printer driver 96 is equipped with the resolution conversion module 97, the color correction module 98, the halftone module 99, and the rasterizer 100 in the example shown in drawing 2. Moreover, the color correction table LUT and the dot formation pattern table DT are memorized.

[0019] The resolution conversion module 97 is changed into the resolution of the color picture data (it consists of three colors of RGB) which the application program 95 is treating, i.e. the resolution in which a printer driver 96 can treat the number of pixels per unit length. the cyanogen (C) for which a printer 22 uses the image data by which resolution conversion was carried out for every pixel, the color correction module 98 referring to the color correction table LUT, a Magenta (M), light cyanogen (LC), a light Magenta (LM), and Hierro — it changes into the data of each color of (Y) and black (K).

[0020] The data by which color correction was carried out have the predetermined gradation value. A printer 22 expresses this gradation value by distributing and forming a dot. When the halftone module 99 performs half toning to data, data turn into data with which a printer 22 can express a gradation value by formation of such a dot. The halftone module 99 performs this half toning, after setting up the dot formation pattern of each ink dot with reference to the dot formation pattern table DT according to the gradation value of image data. The processed image data is rearranged into the sequence transmitted to a printer 22 by the rasterizer 100, and is outputted as final print-data PD. Print-data PD contains the data in which the raster data showing the record condition of the dot at the time of each horizontal scanning and a vertical-scanning feed per revolution are shown. In this example, although it is only playing the role which forms a dot according to print-data PD and the printer 22 is not performing the image processing, it does not interfere as what performs these processings by the printer 22.

[0021] Next, drawing 3 explains the outline configuration of a printer 22. The device in which this printer 22 conveys a print sheet P by the paper feed motor 23 so that it may illustrate. The guides 29a and 29b (not shown in drawing 3) which guide a print sheet P in the case of conveyance. The device in which carriage 31 is made to reciprocate to the shaft orientations of a platen 26 by the carriage motor 24. It consists of a device in which drive the print head 28 carried in carriage 31, and formation of the regurgitation of ink and an ink dot is performed, and a control circuit 40 which manages an exchange of a signal with these paper feed motors 23, the carriage motor 24, the print head 28, and a control panel 32.

[0022] The device in which carriage 31 is made to reciprocate to the shaft orientations of a platen 26 by the carriage motor 24, it consists of a device in which the shaft of a platen 26, and parallel, and consists of location detection sensor 39 grades which detect the pulley 38 which stretches the endless driving belt 36 between the sliding shafts 34 and the carriage motors 24 which hold carriage 31 possible [sliding], and the home position of carriage 31.

[0023] carriage 31 — the cartridge 71 for black ink (K), cyanogen (C), light cyanogen (LC), a Magenta (M), light MAZENDA (LM), and Hierro — the cartridge 72 for color ink which contained the ink of six colors of (Y) can be carried. A total of six heads 61 for ink regurgitation thru or 66 are formed in the print head 28 of the lower part of carriage 31, and the introductory tubing 67 which leads the ink from an ink tank to each of this head for colors is set up by the parts basilaris ossis occipitalis of carriage 31. If carriage 31 is equipped with the cartridge 71 for black (K) ink, and the cartridge 72 for color ink from the upper part, the introductory tubing 67 will be inserted in the connection hole prepared in each cartridge, and supply of the head 61 for regurgitation

thru/or the ink of 66 will be attained from each ink cartridge.

[0024] Drawing 4 is the explanatory view having shown the structure of piezo-electric element PE and Nozzle Nz in the detail. Piezo-electric element PE which is one of the electrostriction components and was excellent in responsibility is arranged for every nozzle the head 61 of each color prepared in the carriage 31 lower part thru/or 66. And piezo-electric element PE is installed in the location adjacent to the ink path 68 to which ink is led to Nozzle Nz so that it may illustrate on the drawing 4 upper case. The crystal structures of piezo-electric element PE are distortion and the component which changes electric-mechanical energy into a high speed extremely by impression of an electrical potential difference as everyone knows. Piezo-electric element PE elongates only the impression time amount of an electrical potential difference, and makes one side attachment wall of the ink path 68 deform in this example, by impressing the electrical potential difference of predetermined time width of face to inter-electrode [which was particle Ip sinks into the form P with which the platen 26 was equipped.

[0025] Drawing 5 is the explanatory view showing the array of the ink jet nozzle Nz in the heads 61-66 for ink regurgitation. Arrangement of these nozzles consists of 6 sets of nozzle arrays which carry out the regurgitation of the ink for black (K), cyanogen (C), and light (cyanogen LC) (Magenta M) light MAZENDA (LM) (Hierra Y) each color of every, and is arranged by the single tier in the nozzle pitch k with 48 fixed nozzles, respectively. A "nozzle pitch" is a value which shows a part for what raster (a part for namely, what pixel) spacing of the direction of vertical scanning of the nozzle allotted on the print head is. Here, a "raster" is the train of the pixel on a par with a main scanning direction. And a "pixel" is the grid of the shape of a grid virtually defined on print media, in order to specify the location which an ink droplet is made to reach the target and records a dot. For example, the pitch k of the nozzle which opens spacing for three rasters in between, and is allotted is 4.

[0026] Drawing 6 is the explanatory view showing the electric configuration of a photograph reflector. As shown in carriage 31 inferior surface of tongue at drawing 5, the photograph reflector 33 is formed in the location same about the direction of vertical scanning as nozzle #4. In addition, as for the photograph reflector 33, it is [that what is necessary is to just be prepared near the nozzle of #1 located in the edge of the downstream of the direction of vertical scanning] more desirable than the nozzle of #1 to prepare in the upstream only several times of the pitch of a nozzle. This photograph reflector 33 prepares 33d of light emitting diodes, and photo transistor 33t as one, as shown in drawing 6. 33d of light emitting diodes injects light towards a predetermined detection point, and they change change of the quantity of light into change of a current in response to the reflected light photo transistor 33t. CPU41 in a control circuit 40 judges whether some print sheets P are in a detection point according to whether photo transistor 33t received the reflected light reflected by the print sheet P.

[0027] This photograph reflector 33 is equivalent to the "detection section" said to a claim. And 33d of light emitting diodes is equivalent to a "light-emitting part," and photo transistor 33t is equivalent to a "light-sensing portion." In addition, a light-emitting part can also be used as laser that what is necessary is just what can inject light towards a predetermined detection point. Moreover, a light sensing portion can also be used as a photodiode that what is necessary is just what can receive the reflected light which light reflected in said print media.

[0028] Drawing 7 is the top view showing the circumference of a platen 26. The platen 26 is formed in the direction MS of horizontal scanning for a long time than the width of face of a print sheet P so that each nozzle of the print head 28 may be faced in horizontal scanning. And the upstream paper feed rollers 25a and 25b are formed in the upstream of a platen 26. They are two or more small rollers which upstream paper feed roller 25b rotates freely to upstream paper feed roller 25a being one driving roller. Moreover, the downstream paper feed rollers 25c and 25d are formed in the lower stream of a platen. Downstream paper feed roller 25c is two or more rollers formed in the driving shaft, and downstream paper feed roller 25d is two or more

small rollers which rotate freely. Downstream paper feed roller 25c and upstream paper feed roller 25a rotate synchronously so that the speed of a periphery may become equal.

[0029] The print head 28 reciprocates the platen 26 top inserted into these upstream paper feed rollers 25a and 25b and the downstream paper feed rollers 25c and 25d in horizontal scanning. A print sheet P is held at the upstream paper feed rollers 25a and 25b and the downstream paper feed rollers 25c and 25d, and it is supported so that the nozzle train of the print head 28 may be faced by the top face of a platen 26 in a part, in the meantime. And an image is recorded one by one in the ink which vertical-scanning delivery is carried out and breathed out from the nozzle of the print head 28 with the upstream paper feed rollers 25a and 25b and the downstream paper feed rollers 25c and 25d.

[0030] Moreover, 26f of upstream slots and downstream slot 26r are prepared in the upstream and the downstream of the direction of vertical scanning at the platen 26, respectively. 26f of upstream slots and downstream slot 26r are prepared in the main scanning direction for a long time than the width of face of a print sheet P, respectively. Downstream slot 26r is prepared in the location which faces some nozzle groups Nr (nozzle of the part shown with a slash in drawing 7) of the downstream which contains the nozzle of a down-stream edge among the nozzles N on the print head 28. However, the width of face of downstream slot 26r is wider than the width of face of the direction of vertical scanning of the nozzle group Nr. And 26f of upstream slots is established in the location which faces some nozzle groups Nf (not shown in drawing 7) of the upstream which contains the nozzle of an upstream edge among the nozzles on the print head 28. And the width of face of 26f of upstream slots is wider than the width of face of the direction of vertical scanning of the nozzle group Nf.

[0031] Moreover, left-hand side slot 26a and right-hand side slot 26b which are prolonged in the direction of vertical scanning so that each both ends with 26f of upstream slots and downstream slot 26r may be connected are prepared in the platen 26. Left-hand side slot 26a and right-hand side slot 26b are prepared in the range of the direction of vertical scanning for a long time than the impact range of the ink droplet from the nozzle train on the print head. And left-hand side slot 26a and right-hand side slot 26b are prepared so that spacing (main scanning direction) of each center lines may become equal to the width of face of the main scanning direction of a print sheet P. In addition, when a print sheet P is in the predetermined horizontal-scanning location guided with Guides 29a and 29b, left-hand side slot 26a and right-hand side slot 26b should just be prepared so that one side edge section Pa of the direction of horizontal scanning of a print sheet P may be located on left-hand side slot 26a and the side edge section Pb of another side may be located on right-hand side slot 26b. Therefore, as mentioned above, when a print sheet P is in an orientation, it may be prepared so that the side edge section of a print sheet P may be located inside the center line of left-hand side slot 26a and right-hand side slot 26b in addition to the mode which has the side edge section on the center line of left-hand side slot 26a and right-hand side slot 26b.

[0032] It connects mutually and 26f of these upstream slots, downstream slot 26r, left-hand side slot 26a, and right-hand side slot 26b constitute the slot of a quadrilateral. And the absorption member 27 for absorbing this in response to an ink droplet Ip is allotted to the pars basilaris osis occipitalis.

[0033] The print sheet P passes through the opening top of 26f of upstream slots, and downstream slot 26r, while it is having vertical-scanning delivery carried out by the upstream paper feed rollers 25a and 25b and the downstream paper feed rollers 25c and 25d. Moreover, the print sheet P is positioned about the main scanning direction with Guides 29a and 29b so that the right-hand side edge Pb may be located on right-hand side slot 26b on a platen 26 by locating the left-hand side edge Pa on left-hand side slot 26a.

[0034] Next, the internal configuration of the control circuit 40 (refer to drawing 3) of a printer 22 is explained. The PC interface 45 which exchanges data with the computer 90 besides CPU41, PROM42, and RAM43, the buffer 44 for a drive which outputs ON of an ink dot and the signal of OFF to the heads 61-66 for ink regurgitation are formed in the interior of a control circuit 40, and these components and circuits are mutually connected by bus. A control circuit 40 stores the dot data processed by computer 90 in reception, stores this in RAM43 temporarily.

and outputs it to the buffer 44 for a drive to predetermined timing.

[0035] Conveying Form P by the paper feed motor 23, it makes carriage 31 reciprocate by the carriage motor 24, drives the piezo-electric element of each nozzle unit of the print head 28 to coincide, performs the regurgitation of each color ink droplet l_p , forms an ink dot, and the printer 22 which has the hardware configuration explained above forms a multicolor image on Form P.

[0036] In addition, in the printer of this example, in order to print the upper limit P_f of a print sheet P on downstream slot 26r and to print a lower limit P_r on 26f of upstream slots so that it may mention later, different printing processing from the interstitial segment of a print sheet is performed [near the print sheet near the lower limit near the upper limit]. In addition, on these specifications, "upper limit processing" and printing processing [processing / processing / in the interstitial segment of a print sheet / printing / "intermediate processing intermediate treatment", a call and near the upper limit of a print sheet / printing / near the lower limit of a print sheet] are called "lower limit processing". Moreover, when calling upper limit processing and lower limit processing collectively, it is called "vertical edge processing".

[0037] Moreover, the width of face W of the direction of vertical scanning of 26f of upstream slots and downstream slot 26r can be defined by the following formula.

[0038] $W = p\pi n + \alpha$ [0039] Here, p is 1 time of the feed per revolution [an inch], of vertical-scanning delivery in vertical edge processing, n is the count of vertical-scanning delivery carried out in upper limit processing and each lower limit processing, α is the error of vertical-scanning delivery assumed in upper limit processing and each lower limit processing. As for the value of alpha in lower limit processing (26f of upstream slots), it is desirable to set up more greatly than the value of alpha in upper limit processing (downstream slot 26r). The slot which has only the width of face which can catch enough the ink droplet breathed out from a nozzle in the case of defining the width of face of the slot of a platen by the above formulas, then vertical edge processing can be prepared.

[0040] C. Arrangement of a print sheet : drawing 8 is the top view showing arrangement of each part when arranging a print sheet P on a platen 26 first in an ink jet printer. In drawing 8, a print sheet P is caudad turned from the upper part, and vertical-scanning delivery is carried out to the sense of an arrow head SS. In that case, a print sheet P is guided with Guides 29a and 29b (refer to drawing 7), and vertical-scanning delivery is carried out so that a both-sides edge may be located on left-hand side slot 26a of a platen 26, and right-hand side slot 26b.

[0041] In case vertical-scanning delivery of the print sheet P is carried out towards the center-section 26c top of a platen 26, the carriage 31 of the print head 28 is allotted to the left-leaning location on a platen 26 as shown in drawing 8. And when carriage 31 is in the location of drawing 8, the photograph reflector 33 is located in the predetermined detection point DP in 26d of connection parts of left-hand side slot 26a and downstream slot 26r. In this location, 33d of light emitting diodes of the photograph reflector 33 can inject light towards the detection point DP. This detection point DP is a position within the limits in which the nozzle on the print head 28 lists about the location of the direction of vertical scanning. CPU41 can detect whether a print sheet P exists in the detection point DP by the photograph reflector 33.

[0042] Since the photograph reflector 33 can detect a print sheet, without contacting a print sheet, unlike the case where it is the sensor of a contact process, it does not become obstructive in subsequent printing. Moreover, since the photograph reflector 33 is formed in carriage, it does not cross the locus of the ink droplet in horizontal scanning. Therefore, there is little possibility that will apply ink and detectability ability will deteriorate. And since the detection point DP of the photograph reflector 33 is a position within the limits in which a nozzle exists about the direction of vertical scanning, if it arranges a print sheet P near the location of the print sheet P at the time of detecting a print sheet P and an ink droplet is made to breathe out from a nozzle, it can form an image at the tip of a print sheet P without a margin.

[0043] First, vertical-scanning delivery of the print sheet P is carried out to the sense of an arrow head SS from the condition which does not have a print sheet P on a platen 26. And the photograph reflector's 33 detection of the tip stops vertical-scanning delivery of a print sheet P. In this example, the photograph reflector 33 is formed in the location of nozzle #4. CPU41

performs vertical-scanning delivery slightly, after that photograph reflector 33 detects a print sheet P, and it stops vertical-scanning delivery so that the upper limit P_f of a print sheet P may be located in the location of the direction upstream of vertical scanning (direction contrary to an arrow head SS) by the number raster rather than the location of the nozzle (this nozzle is hereafter called a "lower limit nozzle") of the edge of the lower stream of a river of the direction of vertical scanning. As a result of making vertical-scanning delivery of a print sheet P as mentioned above, a print sheet P will be supported by center-section 26c of a platen 26, and the upper limit (upper limit) is located in the drawing bottom in drawing 8 will be located on downstream slot 26r. In addition, the left-hand side edge Pa of a print sheet P is located on left-hand side slot 26a, and the right-hand side edge Pb is located on right-hand side slot 26b.

[0044] Then, it is moved to the right end side of carriage ** like drawing 7, and printing is started. That is, horizontal scanning is performed, making an ink droplet breathe out from a nozzle. In addition, even if it performs vertical-scanning delivery of a print sheet P, when the photograph reflector 33 cannot detect a print sheet P at the detection point DP, CPU41

transmits the signal of an error to a computer 90, and stops printing.

[0045] D. Upper limit processing : record an image without a margin to the upper limit of a print sheet in this example. The record in the upper limit section P_f of a print sheet P is recorded by the nozzle Nr allotted to the location on downstream slot 26r, and the corresponding location about the direction of vertical scanning in that case. And as shown in drawing 7, some nozzles containing the lower limit nozzle of the nozzles Nr are located in the direction lower stream of a river of vertical scanning (the direction of an arrow head SS) rather than the upper limit of a print sheet P. In other words, a print sheet P is arranged so that the upper limit P_f of a print sheet P may be located in the direction upstream of vertical scanning rather than a lower limit nozzle.

[0046] A theory top — a lower limit nozzle — the upper limit of a print sheet P — an image is recordable without arranging a print sheet P to the print head 28, and starting record of a dot, then the until [upper limit full] margin of a print sheet P so that it may be located in a last-minute location. However, in the case of vertical-scanning delivery, an error may arise about a feed per revolution. Moreover, the discharge direction of an ink droplet may shift according to the manufacture error of the print head 28 etc. In this example, rather than the lower limit nozzle, the upper limit P_f of a print sheet P arranges a print sheet P so that it may be located in the upstream, and it is printing the upper limit section P_f of a print sheet P. For this reason, a margin does not arise in the upper limit of a print sheet about the case where the impact location of the ink droplet to a print sheet top shifts.

[0047] Drawing 9 is the side elevation showing the print head 28 at the time of printing initiation, and the relation of a print sheet P. Here, in order to simplify explanation, the number of nozzles is explained as eight pieces. Center-section 26c of a platen 26 is counted from the nozzle of #1 28 print head#2, by two rasters, from the back location, shall be counted from the nozzle of #1 and shall be prepared in the range R26 to the location of 2 raster quota. Therefore, even when an ink droplet l_p is made to breathe out from each nozzle in the condition that there is no print sheet, the ink droplet from the nozzle of #1, #2, #7, and #8 does not reach a platen 26.

[0048] In drawing 7, the nozzle group Nr of the part shown with the slash of the print head 28 is the part in which the nozzle of #1 and #2 is located. Downstream slot 26r is prepared under the part which those nozzles pass in the case of horizontal scanning. And printing is started when the upper limit P_f of a print sheet P is on downstream slot 26r. In this example, since the upper limit section P_f of a print sheet P is printed using the nozzle of #2 which exist right above the upper limit section P_f of a print sheet P, and the nozzle of #1 on the outside of the upper limit section P_f of a print sheet P, an image can be printed, without making a margin in the upper limit section of a print sheet P. Moreover, since the print sheet P is positioned using the photograph reflector 33, a print sheet P can be correctly arranged to the nozzle used for upper limit processing. Furthermore, also when the location of a print sheet shifts according to the error of vertical-scanning delivery etc., since the nozzle of #1 and #2 is on downstream slot 26r, an ink droplet does not reach center-section 26c of a platen 26.

[0049] Drawing 10 is the top view showing the relation between image data D and a print sheet

P. In this example, image data D is set up to the outside of a print sheet P exceeding the upper limit Pr of a print sheet P. Moreover, image data D is similarly set up to the outside of a print sheet P across the edge of a print sheet P about a lower limit Pr, the left-hand side edge Pa, and the right-hand side edge Pb. Therefore, in this example, the relation between the assumption of location of the magnitude of image data D and a print sheet P and image data D at the time of printing and arrangement of a print sheet P comes to be shown in drawing 10. In addition, about the name of right and left of the left-hand side edge Pa and the right-hand side edge Pb, since it was made to correspond with the name of right and left of a printer 22, in the print sheet P, actual right and left and the name of the left-hand side edge Pa and the right-hand side edge Pb are reverse.

[0050] E. Printing of the right-and-left side edge section : drawing 11 is the explanatory view showing printing of the right-and-left side edge section of a print sheet P. Including a upper limit processing and lower limit processing, through the whole record of the image to a print sheet P, in this example, it prints so that a margin may not be prepared in the right-and-left edge of a print sheet P, but when it is the location where Nozzle Nz exceeded the edge of a print sheet P, either. In that case, in horizontal scanning, the print head 28 is sent till the place where all nozzles are located in the outside of a print sheet P across the edge of a print sheet P, and is sent about one edge till the place where all nozzles are too located in the outside of a print sheet P also about an other end exceeding the other end of a print sheet P. And not only when Nozzle Nz is on a print sheet P, but when it is the location where Nozzle Nz exceeded the edge of a print sheet P and is on left-hand side slot 26a or right-hand side slot 26b, according to image data D, the regurgitation of the ink droplet is carried out from the nozzle Nz.

[0051] By performing such printing, also when a print sheet P shifts to a main scanning direction somewhat, an image can be formed, without making a margin to the both ends of right and left of a print sheet P. Moreover, when the detection point DP of the photograph reflector 33 is in 26d on 26f of upstream slots, an ink droplet does not reach center-section 26c of a platen 26.

arranging a print sheet P in a right location also about a main scanning direction. And since the nozzle which prints the both-sides edge of a print sheet is a nozzle located on left-hand side slot 26a or right-hand side slot 26b, also when an ink droplet shifts from a print sheet P, an ink droplet reaches left-hand side slot 26a or right-hand side slot 26b, without reaching center-section 26c of a platen 26. Therefore, a print sheet P is not soiled by the ink droplet which reached center-section 26c of a platen 26.

[0052] F. Lower limit processing : drawing 12 is the top view showing 26f of upstream slots at the time of printing the lower limit section Pr of a print sheet P, and the relation of a print sheet P. In this example, an image is recorded without a margin to the edge of a print sheet P about a lower limit as well as the case of upper limit. In drawing 12, it is the part in which the nozzle for which the nozzle group Nf of the part shown with the slash of the print head 28 carries out lower limit processing is located. 26f of upstream slots is prepared under the part, which those nozzles pass in the case of horizontal scanning. And when the lower limit Pr of a print sheet P is located , the location shown with the alternate long and short dash line on 26f of upstream slots, printing of the lower limit section Pr is performed and printing is ended after that. At this time, some nozzles of the nozzle groups Nf are located in the direction upstream of vertical scanning rather than the lower limit (it sets to drawing 12 and is the edge of a drawing top) of a print sheet P.

[0053] the case of upper limit processing — the same — the nozzle (this nozzle is hereafter called an "upper limit nozzle") of the direction of vertical scanning maximum upstream — the lower limit of a print sheet P — when located in a last-minute location, a thing [which record the dot of a lower limit / to do], then theory top can record the until [lower limit full] image of a print sheet. However, in this example, when the lower limit of a print sheet P is located downstream rather than an upper limit nozzle, it prints the lower limit section Pr of a print sheet P. Therefore, a margin does not arise in the lower limit of a print sheet about the case where the impact location of the ink droplet to a print sheet top shifts.

[0054] Drawing 13 is the side elevation showing the print head 28 at the time of printing the lower limit section Pr of a print sheet P, and the relation of a print sheet P. In case the lower

limit section Pr of a print sheet P is printed, the lower limit Pr of a print sheet P is located on 26f of upstream slots. And printing of the lower limit section Pr of a print sheet P is carried out using the nozzle of #7 which exist right above the lower limit section Pr, and the nozzle of #8 on the outside of the lower limit section Pr of a print sheet P. For this reason, the printer 22 of this example can print an image, without making a margin in the lower limit section Pr of a print sheet P. Moreover, in case the printer 22 of this example starts printing, it is positioning the print sheet P using the photograph reflector 33. For this reason, as long as vertical-scanning delivery after printing initiation is performed correctly, a print sheet P can be correctly arranged to the nozzle used in the case of lower limit processing. Furthermore, also when the location of a print sheet shifts according to the error of vertical-scanning delivery etc., since the nozzle of #7 and #8 is on 26f of upstream slots, an ink droplet does not reach center-section 26c of a platen 26.

[0055] G. modification: — the range which this invention is not restricted to an above-mentioned example or an above-mentioned operation gestalt, and does not deviate from that summary in addition — setting — various voice — it is possible to set like and to carry out, for example, the following deformation is also possible.

[0056] G1. modification 1: In the above-mentioned example, the detection section was prepared on [one] carriage 31. However, the detection section can also be prepared in other parts of a printer 22. For example, carriage 31 is better for the location further distant from the platen than the space through which carriage 31 passes in horizontal scanning also as preparing the detection section independently. The existence of the print sheet in a detection point can be detected without moving such a mode, then carriage 31. And it is not influenced [the] also when a dimension error arises in the location of the carriage in horizontal scanning. Furthermore, two or more detection sections corresponding to a detection point different, respectively can be prepared. This can be detected also when a print sheet shifts to preparing the detection section on a left-hand side slot and a right-hand side slot, respectively, then which sense of a main scanning direction.

[0057] Moreover, the detection section can also consider as the mode which moves independently [carriage 31] on the sliding shaft 34. And it does not become trouble in the case of moving the detection section so that carriage and the detection section may not interfere in the case of printing, then printing. Compared with such a mode, then the mode which prepares the detection section in the location which is further distant from a platen from the above-mentioned carriage 31, the dimension of the height direction of a printer can be made small.

[0058] Drawing 14 is the top view showing the circumference of the platen 26 of a modification. The detection section may be further prepared in the lower stream of a river of the direction of vertical scanning again rather than the location to which carriage 31 goes and comes back in horizontal scanning. By detecting print media by the detection section (photograph reflector 33a) also as such a mode, print media can be positioned correctly, a dot can be recorded and an image can be formed on a record medium. However, to allot Mizogami the upper limit section of a print sheet and print without a margin to the upper limit of a print sheet with Mizogami's nozzle, in such a mode, it is necessary to turn a print sheet to the upstream of the direction of vertical scanning, and to send a print sheet in the direction contrary to usual.

[0059] It can also consider as the mode which prepares the detection section in the upstream of the direction of vertical scanning further on the other hand rather than the location to which carriage 31 goes and comes back in horizontal scanning. In such a mode, after detecting a print sheet in the detection section, after only the specified quantity performs vertical-scanning delivery, a print sheet can be arranged so that starting printing, then the upper limit of print media may come to the location of arbitration, and printing can be started. Therefore, after print sheet detection, vertical scanning can be performed so that the upper limit of a print sheet may come to Mizogami, and edge printing can also be performed with Mizogami's nozzle from the condition. Thus, the purpose of detecting the location of print media with allotting the detection section to the lower stream of a river or the upstream of the direction of vertical scanning, then simple structure can be attained, and equipment can also be made smaller than the location to which carriage 31 gone and comes back in horizontal scanning.

[0060] G2. modification 2: In the above-mentioned example, although both upper limit processing

and lower limit processing were performed, the need is accepted and it may be made to perform only a gap or one side. Moreover, it is good also as carrying out neither upper limit processing nor lower limit processing. Although the airline printer of this example equipped the upstream and downstream of the direction of vertical scanning of a platen 26 with 26f of upstream slots, and downstream slot 26i, respectively and equipped right and left, with left-hand side slot 26a and right-hand side slot 26b, it is good also as what is alternatively equipped with either among these. In such a case, as for printing of each edge of a print sheet P, it is desirable to be carried out using the line crack about the edge in which the corresponding slot is established, and the nozzle which is on a slot, respectively. Moreover, it is good also as positioning a print sheet P correctly on the platen which is not equipped with a slot, establishing a margin on all sides, and printing an image in the exact location in a print sheet P.

[0061] G3, modification 3: You may make it transpose a part of configuration of that hardware was realized to software, and may make it transpose a part of configuration of that software realized to hardware conversely in the above-mentioned example. For example, a host computer 90 can perform a part of function of CPU41 (drawing 3).

[0062] The computer program which realizes such a function is offered with the gestalt recorded on the record medium which a floppy disk, CD-ROM, etc. can computer read. A host computer 90 reads a computer program in the record medium, and transmits it to internal storage or external storage. Or you may make it supply a computer program to a host computer 90 from a program feeder through a communication path. When realizing the function of a computer program, the computer program stored in internal storage is performed by the microprocessor of a host computer 90. Moreover, a host computer 90 may be made to carry out immediate execution of the computer program recorded on the record medium.

[0063] In this specification, in the host computer 90, it is a concept containing hardware and operation system, and the hardware which operates under control of operation system is meant. A computer program makes such a host computer 90 realize the function of above-mentioned each part. In addition, a part of above-mentioned function may be realized by not an application program but operation system.

[0064] In addition, in this invention, not only the record medium of a flexible disk or a pocket mold like CD-ROM but the internal storage in computers, such as various kinds of RAM and ROM, and the external storage currently fixed to computers, such as a hard disk, are included with "the record medium in which computer reading is possible."

[Translation done.]

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1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. *** shows the word which can not be translated.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The top view showing the structure of the platen circumference of the ink jet printer in the gestalt of operation of this invention simple.

[Drawing 2] The block diagram showing the configuration of the software of this airline printer.

[Drawing 3] Drawing showing the configuration of the machine part of this airline printer.

[Drawing 4] The explanatory view having shown the structure of piezo-electric element PE and Nozzle Nz in the detail.

[Drawing 5] The top view showing the example of the array of the nozzle unit for every color in the print head unit 60.

[Drawing 6] The explanatory view showing the electric configuration of a photograph reflector.

[Drawing 7] The top view showing the circumference of a platen 26.

[Drawing 8] The top view showing arrangement of each part when arranging a print sheet P on a platen 26 first in an ink jet printer.

[Drawing 9] The side elevation showing the print head 28 at the time of printing initiation, and the relation of a print sheet P.

[Drawing 10] The top view showing the relation between image data D and a print sheet P.

[Drawing 11] The explanatory view showing printing of the right-and-left side edge section of a print sheet P.

[Drawing 12] The top view showing 26f of upstream slots at the time of printing the lower limit section Pr of a print sheet P, and the relation of a print sheet P.

[Drawing 13] The side elevation showing the print head 28 at the time of printing the lowest edge of a print sheet, and the relation of a print sheet P.

[Drawing 14] The top view showing the circumference of the platen 26 of a modification.

[Drawing 15] The side elevation showing the circumference of the print head of the conventional printer.

[Description of Notations]

0 — Scanner

1 — CRT

22 — Printer

23 — Paper feed motor

24 — Carriage motor

25a, 25b — Upstream paper feed roller

25c, 25d — Downstream paper feed roller

25p, 25q — Upstream paper feed roller

25r, 25s — Downstream paper feed roller

26 — Platen

26a — Left-hand side slot

26b — Right-hand side slot

26c — Center section

26d — Connection part

26f — Upstream slot

26o — Platen

26r — Downstream slot

27 — Absorption member

28 — Print head

29a, 29b — Guide

31 — Carriage

32 — Control panel

33 33a — Photograph reflector

33d — Light emitting diode

33t — Photo transistor

34 — Sliding shaft

36 — Driving belt

38 — Pulley

39 — Location detection sensor

40 — Control circuit

41 — CPU

42 — PROM

43 — RAM

44 — Buffer for a drive

45 — PC interface

60 — Print head unit

61-66 — Head for ink regurgitation

67 — Introductory tubing

68 — Ink path

71 — Cartridge

72 — Cartridge for color ink

90 — Computer

91 — Video driver

95 — Application program

96 — Printer driver

97 — Resolution conversion module

98 — Color correction module

99 — Halftone module

100 — Rasterizer

[Translation done.]

して、左側脚部 26 a と右側脚部 26 b は、それぞれの中心線同士の(主走査方向)の間隔が、印刷用紙Pの主走査方向の幅に等しくなるように設けられている。なお、左側脚部 26 a と右側脚部 26 b は、印刷用紙Pがガイド 29 a、29 b によってガイドされる所定の主走査位置にあるとき、印刷用紙Pの主走査の方向の一方の側脚部P a が左側脚部 26 a 上に位置し、他方の側脚部P b が右側脚部 26 b 上に位置するように設けられている。したがって、上記のように、印刷用紙Pが定位位置にあるとき、その側脚部が左側脚部 26 a と右側脚部 26 b の中心線上にある頭部以外に、印刷用紙Pの側脚部が左側脚部 26 a と右側脚部 26 b の中心線よりもより近い。したがって、上記のように、印刷用紙Pが定位位置にあるとき、その側脚部が左側脚部 26 a と右側脚部 26 b の中心線上にある頭部以外に、印刷用紙Pの側脚部が左側脚部 26 a と右側脚部 26 b の中心線よりも内側に位置するように設けられていてもよい。

1 100321 これら上流側脚部 26 f、下流側脚部 26 g、左側脚部 26 a および右側脚部 26 b は互いに接続されており、凹四形の構部を構成する。そして、その底面にはインク滴 10 を受けたこれを吸収するための吸収部 27 が形成している。

1 100331 既述用紙Pは、上流側脚部送りローラ 25 a および下流側脚部送りローラ 25 c、25 d に由つて副走査送りを実施されているときには、上流側脚部 26 f と下流側脚部 26 g の間の開口を通過していく。また、印刷用紙Pは、プラテン 26 h 上において、左側脚部P a は左側脚部 26 a 上に位置し、右側脚部P b は右側脚部 26 b 上に位置するように、ガイド 29 a、29 b によって主走査方向について位置決めされている。

3 100341 次に、プリンタ 2 の制御回路 40 (図3 参照) の内部構成を説明する。制御回路 40 の内部には、CPU 41、PROM 42、RAM 43 の他、コンピュータ 9 のデータのやり取りを行う PC インタフェース 44 と、インク供給ヘッド 26 d にインクドットの ON/OFF の信号を出力する駆動用ハウジング 45 が設けられており、これらの電子部品および回路はバスで相互に接続されている。制御回路 40 は、コンピュータ 9 で処理されたドットデータを受け取り、これを一時的に RAM 43 に蓄え、所定のタイミングで運動用ハウジング 44 に出力する。

1 100351 以上説明したハードウェア構成を有するプリンタ 2 は、紙送りモータ 23 により用紙Pを搬送しつつ、キャリッジ 31 をキャリッジモータ 24 により往復駆動させ、同時に印刷ヘッド 28 の各ノズルユニットのビーン電子を駆動して、各色インク滴 10 の吐出を行ない、インクドットを形成して用紙P上に多色の画像を形成する。

4 100361 なお、本実例のプリンタにおいては、後述するように、印刷用紙Pの上端部P f を下流側脚部 26 g 上で印刷し、下端部P r を上流側脚部 26 a 上で印刷するため、印刷用紙の上端近傍と下端近傍において、印刷用紙の中間部分とは異なる印刷処理が行われる。なお、この明細書では、印刷用紙の中間部分における印刷

処理を「中端処理」と呼び、また、印刷用紙の上端附近における印刷処理を「上端処理」、印刷用紙の下端附近における印刷処理を「下端処理」と呼ぶ。また、上端処理と下端処理とをまとめて呼ぶときには「上下端処理」と呼ぶ。

[0037] また、上端側部 26 f やおよび下端側部 26 r の副走査方向の幅 WH は、次の式で定めることができる。

$$[0038] W = p \times n + a$$

[0039] ここで、p は、上端処理における副走査送りの1回の走査量 [インチ] である。n は、上端処理、下端処理それぞれにおいて実施する副走査走りの回数である。a は、上端処理、下端処理それぞれにおいて想定される副走査走りの誤差である。下端処理 (上端側部 26 f) における a の値は、上端処理 (下端側部 26 r) における a の値よりも大きくなることとが好ましい。上端のような式でフランジの幅を定めることとが可能となる。上端処理の際にノズルから吐出されるインク滴を十分止められるだけの幅を有する構造を設計することができる。

[0040] ④ 印刷用紙の配置: 図 8 は、インクジェットプリンタにおいて最初に印刷用紙 P をフランジ 26 上に配置するときの各部の配置を示す平面図である。図 8においては、印刷用紙 P は、上方から下方に向けて矢印 S の向きに副走査走りされる。その際、印刷用紙 P は、ガイド 29 a、29 b (図 7 参照) によってガイドされ、両端端がフランジ 26 の左側部 26 a、右側部 26 b 上に位置するように副走査走りされる。

[0041] 印刷用紙 P がフランジ 26 の中央部 26 c 上に向けた副走査走りされる際には、印刷ヘッド 28 の左寄りの位置に配される。図 8 に示すように、キャリッジ 31 が図 8 の位置にあるとき、フォトリフレクタ 33 は、左側部 26 a と下流側部 26 r の接続部分 26 d にある所定の出走点 D P 上に位置する。この位置においてて、フォトリフレクタ 33 の曝光ダイヤード 33 d は、出走点 D P に向け光を射出することができる。この後出走点 D P は、副走査方向の位置については、印刷ヘッド 28 上のノズルが存在する範囲内の所定の位置である。CPU 41 は、フォトリフレクタ 33 によって、検出地点 D P に印刷用紙 P が存在するか否かを検知することができる。

[0042] フォトリフレクタ 33 は、印刷用紙に接触することなく印刷用紙を検知することができるため、接続部のセンサの場合と異なり、その後の印刷において邪魔になることがない。また、フォトリフレクタ 33 は、キャリッジに設けられているため、主走査におけるインク滴の軌跡と交わることがない。よって、インクがかかるて検出性能が劣化する可能性が少ないと、そして、フォトリフレクタ 33 の検出地点 D P は、副走査方向について

ノズルP1
用紙P1
紙P1を切
剥用紙
れる。
る。本
の位置
フレク
查送り
下、こ
も数ラ
向)の
副送蓋
走蓋送
の中央
いて上
に位置
aは左
部2.6
1.00
側に移
ちイン
刷用紙
3によ
できな
ラーの
1.00
上端ま
の上端
側隣部
スルN
に、ノ
は、印
の方向
Pfが
に印刷
0.00
ぎりぎ
して印
を記録
送り盈
ド2
れる場
が、下
Pを配

1. 04 71 図
印刷紙との関係
簡単にするため
テン 26 の中央
スルから数えて 2
ルから数えて 2
けられているも
状態で各ノズル
も、#1、#2
ブラン 2.6 に
100481 図
した部分のノズ
する部分の下方に
る。そして、
があるときに
用紙 P の上端部
用紙 P の上端部
して印刷用紙 P
P の上端部に余
できる。また、
紙 P の位置決め
ノズルに対して
間。さらに、副
部 2.6 上にあ
100491 図
端部を示す平面
上端 P 1 を経て
設定する。また
ついても同様に
外側まで画像
例においては、
印用紙側の画像
の貼付は、図 1
a、右端端 P 2
a、右端端 P 2
は、実際の左右
になっている。
100501 図
紙 P の左右端
では、上端処理
画像の記録全体
白を設けないよ
8、主走査に
スルが印刷用紙

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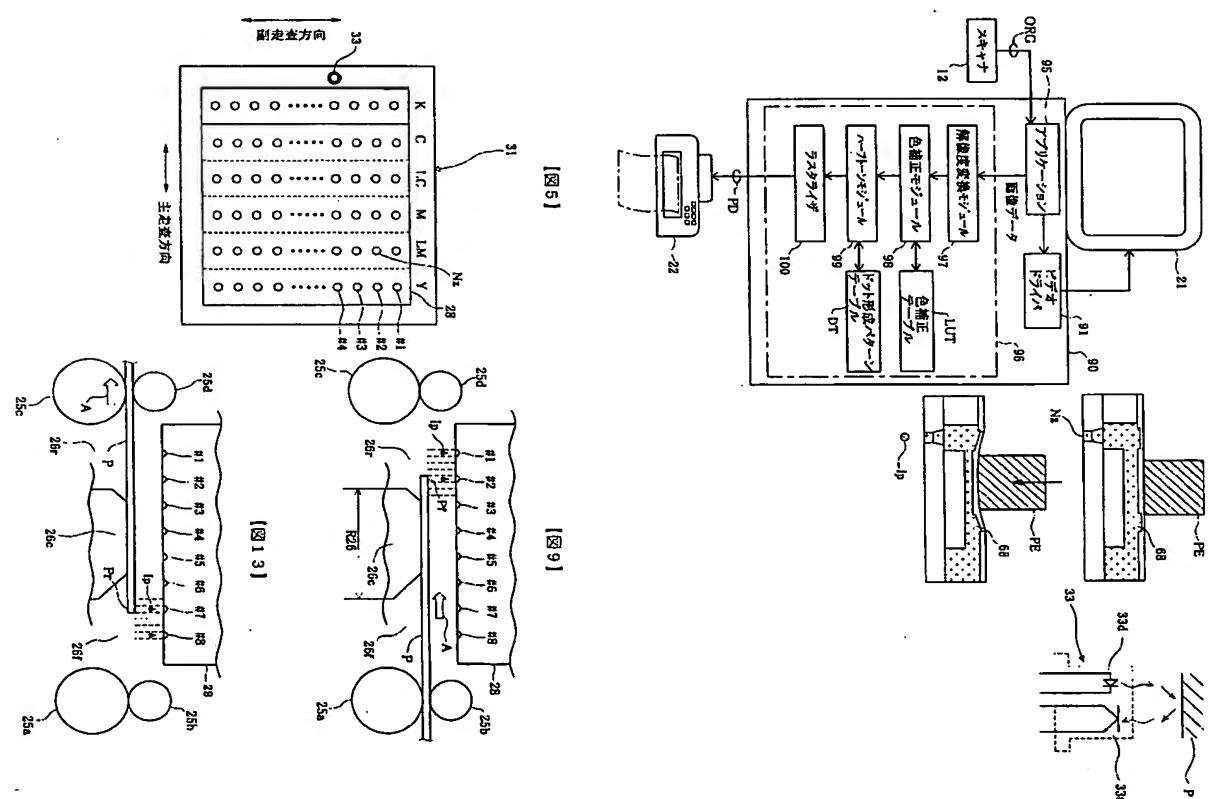
2.2...プリント 2.3...紙送りモータ	3.4...複数枚 3.6...運動ベルト
2.4...キャリントジモータ	3.8...ブーリ
2.5 a, 2.5 b...上流側紙送りローラ	3.9...位置検出センサ
2.5 c, 2.5 d...下流側紙送りローラ	4.0...制御回路
2.5 p, 2.5 q...上流側紙送りローラ	4.1...CPU
2.5 r, 2.5 s...下流側紙送りローラ	4.2...ROM
2.6...フランジ	4.3...RAM
2.6 a...左側導部	4.4...駆動用バッファ
2.6 b...右側導部	4.5...PCインターフェース
2.6 c...中央部	6.0...印別ヘッドドライバ
2.6 d...接続部分	6.1~6.6...インク吐出用ヘッド
2.6 f...上流側導部	6.7...導入管
2.6 o...フランジ	6.8...インク通路
2.6 r...下流側導部	7.1...カートリッジ
2.7...吸収部材	7.2...カラーリング用カートリッジ
2.8...印刷ヘッド	9.0...コンピュータ
2.8 o...印刷ヘッド	9.1...ビデオドライバ
2.9 b...カバー	9.5...プリケーションプログラ
3.1...キャリントジ	20...9.6...プリントドライバ
3.2...操作パネル	9.7...解像度変換モジュール
3.3, 3.3 a...トリフレクタ	9.8...色補正モジュール
3.3 d...発光ダイオード	9.9...ハーフトーンモジュール
3.3 t...フォトランジスタ	10.0...ラスタライザ

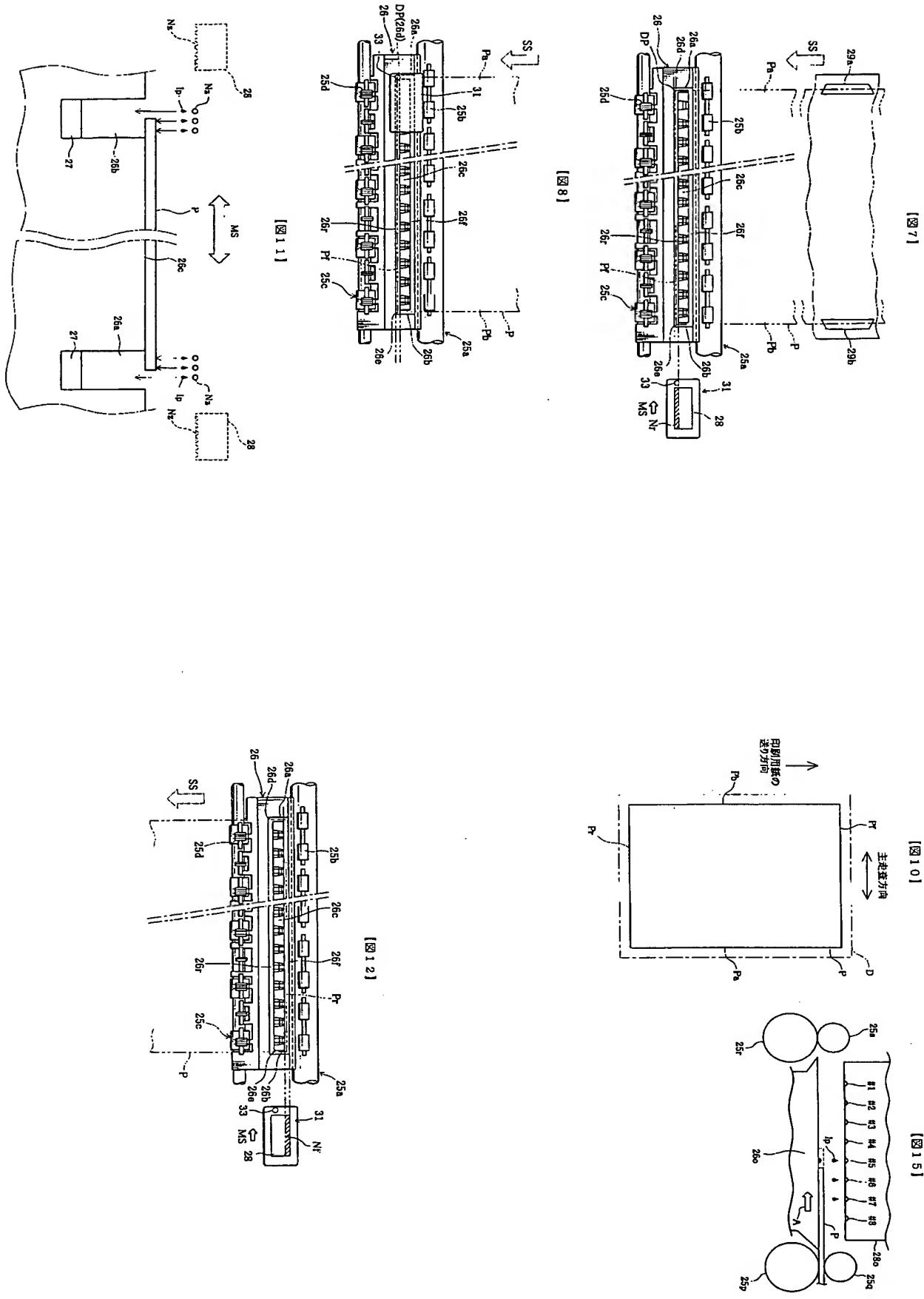
11

3

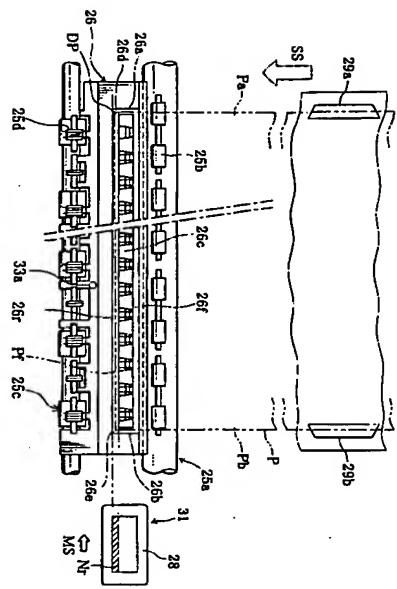
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[図14]



フロントページの焼き

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